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# *Sinosophiopsis* (Brassicaceae), a New Genus Endemic to China

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**ABSTRACT.** The new genus *Sinosophiopsis* (Brassicaceae) is described, and its relationship to *Sophiopsis* is discussed. The new species *Sinosophiopsis bartholomewii* is described, and the new combination *S. heishuiensis* is proposed.

During the revision of Chinese Brassicaceae for the forthcoming volume 8 of the *Flora of China*, two species were initially set aside for future study. As the result of critical comparisons of these two taxa with most of those of the known Eurasian genera, the conclusion reached is it to place them in a new genus, hereafter known as *Sinosophiopsis*.

*Sinosophiopsis*, which is endemic to China, is most closely related to the central Asian genus *Sophiopsis*. Both genera consist of annuals with incumbent cotyledons, reticulate and mucilaginous seeds, pinnatisect leaves, terete fruits, and branched trichomes. *Sinosophiopsis* is easily distinguished by having white flowers, linear and strongly torulose fruits, angled and longitudinally striate stems, indumentum consisting of simple and forked trichomes, and ovaries (20 to)24- to 40-ovulate. By contrast, *Sophiopsis* has yellow flowers, elliptic, obovate, or narrowly oblong, usually non-torulose fruits, terete stems, indumentum of primarily dendritic trichomes only rarely mixed with simple ones, and ovaries 4- to 12(to 16)-ovulate.

One of the two species assigned herein to *Sinosophiopsis* was previously described by Wang (1987) as *Cardamine heishuiensis*, and that placement was followed by Tan et al. (1999) without further evaluation. Upon a casual examination of the species, it was immediately concluded that it should be excluded from *Cardamine* for two reasons. First, none of the approximately 200 species of this genus has branched trichomes, and second, all species of *Cardamine* have flattened repla, explosively dehiscent fruits, and valves spirally coiled during dehiscence (Al-Shehbaz, 1988). *Sinosophiopsis heishuiensis* has a mixture of simple and forked trichomes, terete repla, non-explosively dehiscent fruits, and valves remaining flat during fruit dehiscence. Full descriptions of both species of *Sinosophiopsis* are provided to facilitate a direct comparison.

Because of the limited number of collections

available for both species of *Sinosophiopsis*, little can be said about their overall variability. The two species are readily distinguished from each other by the characters listed in the key below.

***Sinosophiopsis*** Al-Shehbaz, gen. nov. TYPE: *Sinosophiopsis bartholomewii* Al-Shehbaz.

Herba annua, pilosa, trichomatibus simplicibus vel brevistipitatis furcatis. Caulis striatus. Folia caulina petiolata, nonauriculata, pinnatisecta. Racemi multiflori, bracteati vel ebracteati. Sepala oblonga, nonsaccata. Petala alba, spathulata, breviter unguiculata. Ovula (20-)24-40. Fructus lineares, tereti, valde torulosi, stigmatibus integris, septo completo. Semina oblonga, reticulata, uniseriata, mucilaginosa; cotyledones incumbentes.

Annual herbs. Trichomes a mixture of simple and short-stalked forked ones. Stems erect, simple or branched at base and above middle, angled and longitudinally striate at least distally. Basal leaves withered by anthesis. Cauline leaves petiolate, not auriculate at base, pinnatisect. Racemes many flowered, ebracteate or bracteate along proximal half, elongated considerably in fruit. Fruiting pedicels slender ascending to divaricate or reflexed. Sepals oblong, deciduous, ascending, base of inner pair not saccate, margin and apex membranous. Petals white, longer than sepals; blade spatulate, apex obtuse; claw distinct, shorter than sepals. Stamens 6, tetradynamous; filaments wingless, not dilated at base; anthers ovate, not apiculate at apex. Nectar glands confluent and subtending bases of all stamens; median nectaries present. Ovules (20 to)24 to 40 per ovary. Fruit dehiscent siliques, linear, terete, not inflated; replum rounded, visible; septum complete, membranous, translucent, veinless; style distinct, less than 1 mm, slender, cylindrical, glabrous; stigma capitate, entire, unappendaged. Seeds uniseriate, wingless or apically winged, oblong, plump; seed coat coarsely reticulate, mucilaginous when wetted; cotyledons incumbent.

Two species: endemic to China (Qinghai, Sichuan, Xizang)

## KEY TO THE SPECIES OF *SINOSOPHIOPSIS*

- 1a. Raceme bracteate at least along proximal half; fruiting pedicels 1-3(-4) mm long; seeds wingless; petals 2-2.5 × 0.7-1 mm . . . . . 1. *S. bartholomewii*



1b. Racemes ebracteate; fruiting pedicels (5-)7-15 mm long; seeds apically winged; petals 4-5 × 1.5-2 mm . . . . . 2. *S. heishuiensis*

**1. *Sinosophiopsis bartholomewii*** Al-Shehbaz, sp. nov. TYPE: China. Qinghai: Nangqên Xian, Larong Gou on E side of the Zi Qu, N of Jiangxi Forest Station and SE of Mozhong, 3450 m, 32°9'N, 97°3'E, 29 Aug. 1996, *T. N. Ho, B. Bartholomew, M. Watson & M. G. Gilbert 2621* (holotype, MO; isotypes, BM, CAS, E, GH, HNWP). Figure 1.

Herba annua, (7-)13-55(-65) cm alta, sparse pilosa. Caulis longitudinaliter striatus, pilosus vel glabrescens. Folia caulina mediana pinnatisecta, 1.5-5.5 × 0.5-2.5 cm; 3-5 juga; petiolis 4-13 mm longis, nonauriculatis, segmentis terminalibus lanceolatis, ellipticis, vel oblongis, 0.7-2 cm × 3-7 mm, dentatis. Racemi in dimidio inferiori bracteati. Pedicelli fructiferi 1-3(-4) mm longi. Sepala oblonga, 1-1.3 × 0.4-0.6 mm, nonsaccata. Petala alba, spatulata, 2-2.5 × 0.7-1 mm, breviter unguiculata. Ovula (20-)26-36. Fructus lineares, tereti, (1-)1.5-2.5(-2.8) cm × 0.8-1(-1.2) mm, valde torulosi; stylo 0.1-0.3 mm longo. Semina oblonga, 0.8-1.1 × 0.5-0.6 mm.

Annual herbs, (7-)13-55(-65) cm tall, sparsely pilose with a mixture of simple and short-stalked, 1-forked trichomes to 1 mm long. Stems erect, simple or branched along lower half, longitudinally striate, pilose or glabrescent distally. Basal leaves withered by flowering. Middle cauline leaves pinnatisect, 1.5-5.5 × 0.5-2.5 cm; petiole 4-13 mm long, not auriculate at base; terminal lobe lanceolate, oblong, or elliptic, 0.7-2 cm × 3-7 mm, base decurrent with distal pair of lateral lobes, margin dentate, apex acute to subacuminate; lateral lobes 3 to 5 on each side of midvein, similar to terminal lobe but smaller. Uppermost cauline leaves with axillary flowers, undivided, much smaller than middle leaves, margin entire or denticulate. Raceme bracteate at least along proximal half. Fruiting pedicels ascending to divaricate, 1-3(-4) mm long, straight, slender, glabrous or sparsely pilose. Sepals oblong, 1-1.3 × 0.4-0.6 mm, glabrous or sparsely pilose, not saccate. Petals white, spatulate, 2-2.5 × 0.7-1 mm, base attenuate, apex obtuse; claw shorter than sepals. Median pairs of staminal filaments 1.5-1.8 mm long, lateral pair 1.1-1.3 mm long; anthers ovate, ca. 0.2 mm long. Ovules (20 to)26 to 36 per ovary. Fruit linear, (1-)1.5-2.5(-2.8) cm × 0.8-1(-1.2) mm, terete; valves strongly torulose, glabrous or sparsely puberulent; style 0.1-0.3 mm long. Seeds brown, oblong, 0.8-1.1 × 0.5-0.6 mm, plump, strongly reticulate, wingless.

*Phenology.* Flowering and fruiting August and September.

*Habitat.* Slopes with *Picea likiangensis* (Franchet) E. Pritzel forest, among shrubs and under trees, disturbed alpine meadows, slopes and riparian areas along river bottoms; elevations 3450-4100 m.

*Distribution.* Endemic to China (Qinghai and Xizang).

*Sinosophiopsis bartholomewii* is named in honor of Bruce Bartholomew (California Academy of Sciences), who organized two expeditions to Qinghai that led to the collection of this novelty, in recognition of more than two decades of devotion to Chinese botany.

*Paratypes.* CHINA. **Qinghai:** Yushu Xian, Jiangxi Gou, E of Jiangxi Forest Station on E side of the Zi Qu, SE of Mozhong, 3620 m, 32°4'N, 97°2'E, 28 Aug. 1996, *T. N. Ho, B. Bartholomew, M. Watson & M. G. Gilbert 2551* (CAS, HNWP, MO); Nangqên Xian, Xiaolong Gou, W of Nangqên on road to Domba, 4000-4100 m, 32°17'N, 96°16'E, 3 Sep. 1996, *T. N. Ho, B. Bartholomew, M. Watson & M. G. Gilbert 2808* (BM, CAS, E, GH, HNWP, MO); Nangqên Xian, along the Ba Qu towards the Xizang border from Bêca Forest Station, SE of Bêca, 3790 m, 31°53'N, 96°31'E, 8 Sep. 1996, *T. N. Ho, B. Bartholomew, M. Watson & M. G. Gilbert 3000* (BM, CAS, E, GH, HNWP, MO). **Xizang (Tibet):** Changdu, 10 Aug. 1976, *Anonymous s.n.* (KUN).

**2. *Sinosophiopsis heishuiensis*** (W. T. Wang) Al-Shehbaz, comb. nov. Basionym: *Cardamine heishuiensis* W. T. Wang, Acta Bot. Yunnan. 9: 15. 1987. TYPE: China. Sichuan: Heishui, Luhwa, 2400 m, 16 July 1957, *Li Xin 73629* (holotype, PE; isotype, IBSC).

Annual herbs 15-45 cm tall, sparsely pilose with a mixture of simple and short-stalked, 1-forked trichomes to 1 mm long. Stems erect, several branched along lower half, longitudinally striate, pilose. Basal leaves withered by flowering. Middle cauline leaves pinnatisect, 1.2-4.5 × 1-2.5 cm; petiole 3-15 mm long, not auriculate at base; terminal lobe lanceolate to elliptic or oblong, 0.3-2 cm × 2-12 mm, base decurrent with distal pair of lateral lobes or base short petiolulate, margin dentate to subentire, apex acute to obtuse; lateral lobes 2 to 4 on each side of midvein, similar to terminal lobe but smaller. Uppermost cauline leaves much smaller and less divided than middle leaves. Raceme ebracteate. Fruiting pedicels divaricate to reflexed, (5-)7-15 mm long, straight, slender, glabrous or sparsely pilose. Sepals oblong, 1.5-2.3 × 0.8-1 mm, glabrous or sparsely pilose, not saccate. Petals white, spatulate, 4-5 × 1.5-2 mm, base attenuate, apex obtuse; claw



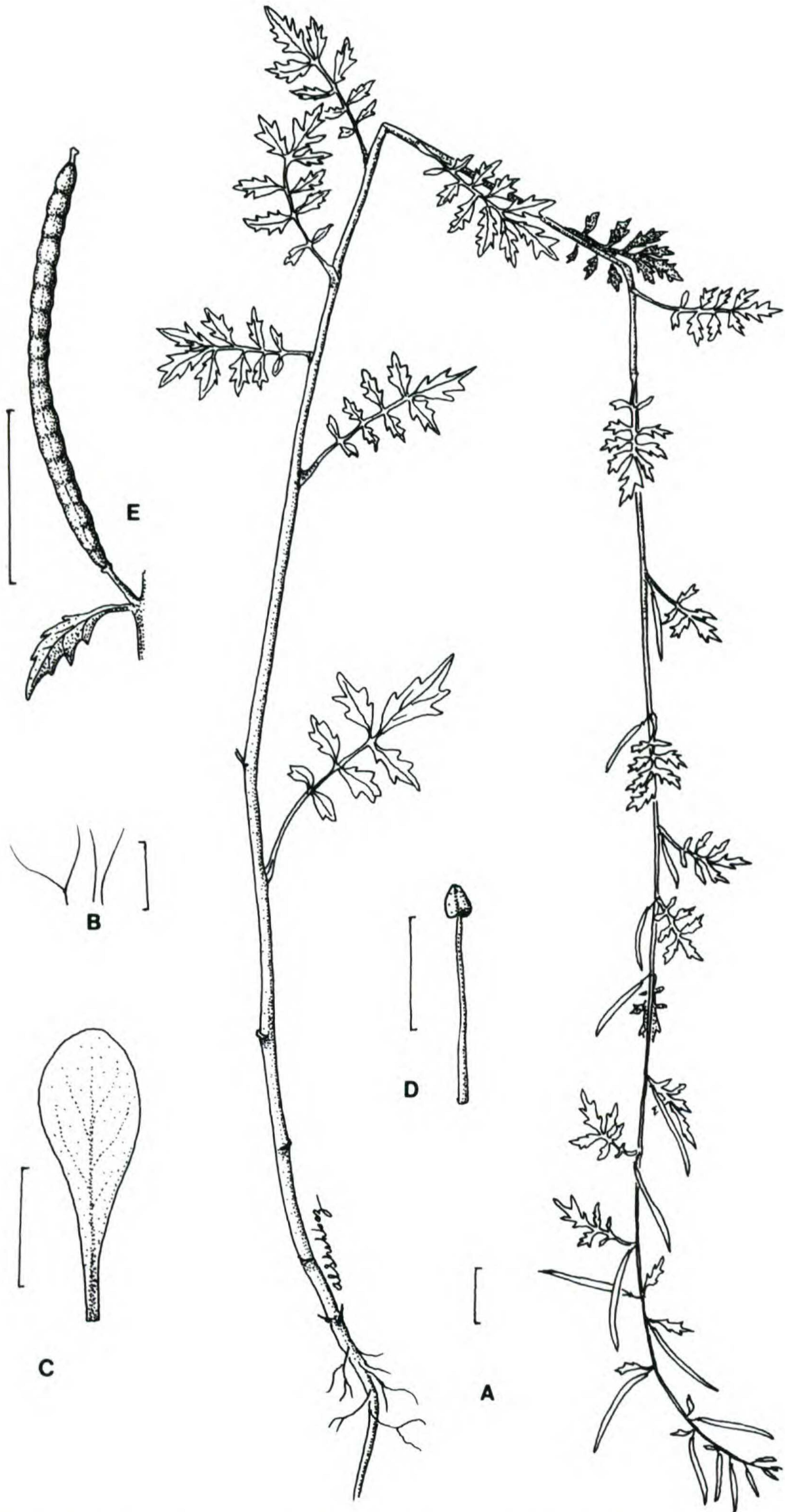


Figure 1. *Sinosophiopsis bartholomewii* Al-Shehbaz. —A. Plant. —B. Stem trichomes. —C. Petal. —D. Median stamen. —E. Fruit, fruiting pedicel, and bract. Drawn by Al-Shehbaz from the holotype (*T. N. Ho et al.* 2621). Scale: A, E = 1 cm; B–D = 1 mm.



shorter than sepals. Median pairs of staminal filaments 2–3 mm long, dilated, lateral pair 1–1.5 mm long; anthers ovate, 0.4–0.5 mm long. Ovules 24 to 40 per ovary. Fruit linear, 1.5–3 cm  $\times$  0.7–1 mm, terete; valves strongly torulose, glabrous; style 0.4–1 mm long. Seeds brown, oblong, 1.2–1.4  $\times$  0.6–0.8 mm, plump, strongly reticulate, apically winged.

*Phenology.* Flowering and fruiting June and August.

*Habitat.* Rock crevices; elevations 2100–2500 m.

*Distribution.* Endemic to China (Sichuan).

*Additional specimens examined.* CHINA. **Sichuan:** Pingwu Xian, Baima, *Wu Zhengyi* 832 (KUN); Heishui, Luhua, *Li Xin* 73727 (PE).

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